
DRFD01

2.8 FLEXIBLE DISK

DRFD01

General description : This driver handles up to two daisy chained flexible disk drives PTS6879, connected to the CPU via channel unit CHFD on programmed channel.

It is possible to adapt the driver to handle drives on the CHFD on the multiplex channel instead of the programmed channel. If required, this must be specified during Monitor generation.

If a Memory Management Unit is included in the system, an MMU buffer is automatically included in the driver, the size being specified during Monitor generation. Logically the drives are independent of each other; however, physically, only one drive can be operated at a time, and each disk has its own file code.

Recommended file codes are /F8, /F9, /FA and /FB. These are assigned automatically if File Management or one of the data management packages is requested during Monitor generation.

On the physical level, the flexible disk should be preformatted to be compatible with IBM 3740. Data is stored per sector with 128 bytes in each sector. Each disk has 26 sectors per track, and a total number of 77 tracks, thus giving a total number of 2002 sectors per disk and a capacity of 0,25 Mbyte.

Because the driver can handle multiple-sector I/O, it is possible to read and write more than one sector with a single LKM request. The Sequential Read and Write orders (/02 and /06) however, transfer only one sector at a time.

In the driver description, three abbreviations are used:
Standard - refers to unlabelled disks when the standard version of the driver is used.

TOSS - refers to TOSS-labelled disks.

IBM - refers to IBM-labelled disks when the IBM handling version of the driver is used.

The version of the driver to be used must be specified during Monitor generation, and may be one of the following:

Standard, TOSS, IBM, IBM and TOSS.

Three different types of disks are handled by the driver :

Unlabelled, TOSS-labelled, and IBM-labelled.

Unlabelled disks :

When reading/writing a sector, each sector is given a standard logical sector number in the range 0 - 2001.

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-----TOSS-labelled disks :

When reading/writing a sector each sector is given a TOSS logical sector number in the range 0 - 1000. Two consecutive physical sectors are combined into one logical sector of 256 characters. Thus, to convert a TOSS logical sector number to a standard sector number, the former should be multiplied by 2.

IBM-labelled disks :

The driver provides means for sequential access to datasets on IBM-labelled disks. An IBM-labelled disk may contain up to 19 datasets. Each dataset has its own unique dataset label on one of the physical sectors 08-26 on track 00, corresponding to standard logical sectors 7-25.

It is the users responsibility to provide index track 00 with sufficient data, before using the disk. Using the TOSS utility Write IBM Labels (WIL), it is possible to initialize track 00 and create datasets.

Before a dataset is sequentially accessed, it must be opened by a Load request. At this request the user must select the dataset to be opened by specifying the dataset label sector. Only one dataset per drive can be opened simultaneously.

The data fields of the IBM-labelled disk that affect the driver are:

- Volume ID-field
- Beginning of extent (BOE) of specified dataset label
- End of Data (EOD) of the specified dataset label
- End of extent (EOE) of the specified dataset label.

The driver can only affect the EOD-field of the disk. Direct access to an IBM-labelled disk is also supported by this driver. Each sector is given a standard logical sector number, in the range 0 - 1923. All data on the IBM-labelled disks should be EBCDIC code and will be converted to ISO-7 by the driver.

Note: At Sequential Read/Write requests, no data in the dataset label on disk is affected. However, the CRN or EOD in the driver is updated. Direct Access does not affect these items.

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Calling sequence	: Normal I/O: LDK A7,code LDKL A8,ecb-address LKM DATA :	I/O and activate: LDKL A1,parameter LDK A7,code LDKL A8,ecb-address LKM DATA -1 DATA start-address
Order codes	: The following order codes may be used: /00 - test status /01 - basic read /02 - sequential read /05 - basic write /06 - sequential write /11 - physical read /15 - physical write /1F - format volume /21 - open /22 - close /24 - write deleted data /26 - lock /31 - rewind /37 - load /38 - unload	
Buffer address	: Only significant for orders /00, /01, /02, /05, /06, /11, /15, /24. The buffer address must be even.	
Requested length Effective length	: When writing to the disk, the requested length should be as follows: Standard - (n x 128) where n = 1-511 TOSS - (n x 256) where n = 1-255 IBM - (n x 128) where n = 1-511	
Control word	: Control word 2 must contain the logical number of the (first) sector to be read /written. For order /37, control word 1 must contain the data set number.	

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Return code : The following bits may be set by this driver:

bit	Meaning	Orders in which bit set												
		/00	/01	/02	/05	/06	/11	/15	/1F	/24	/26	/31	/37	/38
0	Illegal request	x	x	y	x	y	x	x		x	x	y	x	x
2	End of extend (IBM)					y								
3	End of data (IBM)			y										
4	No data		x	y			x						y	
5	IBM label	y									y		y	
6	Write protected (status or warning)	x			x	y		x	z	x				y
7	Retries performed		x	y	x	y	x	x	z	x	x		x	y
9	Write protected (error)				x	y		x	z	x				
10	New volume loaded	z	z	z	z	z	z	z	z	z				y
11	Illegal data set label												y	
12	Incorrect length		x	y		y	x	x		x				
13	Data error (CRC)		x	y		y	x	x		x	x		x	y
14	Seek error		x	y	x	y	x	x	z	x	x		x	y
15	Not operable	x	x	y	x	y	x	x	z	x	x	y	x	x

Note: x = Standard/TOSS/IBM,

y = IBM

z = TOSS & IBM

An explanation of the bit meanings is given below:

Bit 0: Illegal request - illegal order, file code or sector number

Bit 2: End of extent (IBM) - set if an attempt is made to write outside the physical space reserved for the dataset at creation time.

Bit 3: End of data (IBM) - set if a record with a number equal to or greater than the EOD is addressed.

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- Bit 4: No data - set if any of the sectors has a Deleted Address mark set. Bit 13 is also set.
- Bit 5: IBM label - set if the disk is not TOSS-labelled. Only significant if the TOSS & IBM version of the driver is used.
- Bit 6: Write protected - set if the flexible disk does not have a write-enable marker on it.
- Bit 7: Retries performed - set if retries have been performed by the driver due to CRC or seek errors.
- Bit 9: Write protected - set after Write orders, together with bit 6, if the flexible disk has no 'write-enable' marker.
- Bit 10: New Volume Loaded - set after system restart, when the volume name read from the disk is different from the volume name that is already stored in the disk Device Work Table. No I/O is performed. The file must be closed, this is the only order that will be accepted. To access the file after that it must be opened again.
- Bit 11: Illegal data set label(IBM) - set if the BOE/EOD/EOE fields can not be transformed into approved logical sector numbers.
- Bit 14: Seek error - set if the requested track is not found after recovery has been performed.
- Bit 15: Not operable - drive is not in operable state.

Order

: /00 - test status

The addressed drive is selected and its status checked. Additionally for TOSS/IBM version of driver:
If the disk is operable, the Volume Name is stored in the Flexible Disk DWT. If the disk is not operable, the request is completed with bit 15 set in the return code. If the requested length is 6, the volume name is transferred to the buffer specified in the ECB.

Order

: /01, /11 - Basic and physical read.

Control word 2 must contain the sector number of the first sector to be read. Control word 1 must be zero. One or more sectors are transferred from the disk to the buffer specified in the ECB.

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- Order : /02 - sequential read
This order only applies to IBM-labelled disks.
The CRN is incremented by one, and the record now pointed to is read into the buffer specified in the ECB. The requested length is not significant, 128 bytes are always transferred. Control word 2 will be set by the driver with the standard logical sector number of the addressed sector.
This request is only accepted if the corresponding data-set has been opened with an order /37 - Load.
If a request error occurs, or the disk is not operable, the CRN will be unchanged.
- Order : /05 - basic write
One or more sectors are transferred from the buffer to the disk. No read-after-write checking is carried out.
- Order : /06 - sequential write
This order only applies to IBM-labelled disks.
One sector is written from the user buffer to the sector pointed to by the corresponding EOD number in the driver. The EOD number is incremented by one.
The requested length is not significant, since 128 bytes are always transferred. If an attempt is made to address a sector after EOE, the request is completed with bit 2 set in the return code. This order is only accepted if the corresponding data set has been opened with an order /37 - Load. If a request error occurs, or the disk drive is not operable, the EOD number will not be incremented.
- Order : /15 physical write
One or more sectors are transferred from the buffer to the disk. Read-after-write checking is carried out.
- Order : /1F - format volume
The volume will be formatted. To obtain a TOSS format, the ECB control word 1 must contain 0. The driver will write a 'dummy' volume label on sector 0. To obtain IBM format, the ECB control word 1 must be set to 1. The driver will write a 'dummy' volume label on sector 6.
- Order : /21 - open
The power is turned on to flexible disk drive unit.
There is then a delay of 1 second to allow the drives to become operable. There is only one power relay, so when this order is given to one of the units, power is turned on for all drives.
No check is made on the open/closed status of the drives and the order is accepted and the time delay performed, even if the drives are already open.
This order is only to be used for service purposes, and can be included during Monitor generation.

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- Order : /22 - close
The power is turned off from the flexible disk drive units. When this order is issued for one unit, power is turned off from all the drives. No check is made on the open/closed status of the drives and the order is accepted even if the drives are already closed. This order is only to be used for service purposes, and can be included during Monitor generation.
- Order : /24 - write deleted data
See order /15, Physical Write for details. The only difference between orders /15 and /24 is that the sectors written by order /24 are preceded by a Deleted Data Address mark.
- Order : /26 - lock
The driver locks the door of the selected device. In the case of an error at this request the door will be unlocked at return. If the door is already locked, no action is taken and the request is completed with a return code of zero (no bits set.)
- Order : /31 - rewind
This order only applies to IBM-labelled disks. The EOD number of the selected drive is set equal to the BOE number. The CRN is set equal to the BOE number minus one.
This order is only accepted if the corresponding data set has been opened with an order /37 - load.
- Order : /37 - load
The driver locks the door of the selected drive. The volume name is read and stored in the Monitor. If an error occurs, the door will be unlocked before the return.

For IBM labelled flexible disks this order must be successfully completed before any other request for the same disk can be executed. Control word 1 must contain the standard logical sector number of the data set label, i.e. a number in the range 7 - 25 for format 128-1.

After the driver has taken the actions described above, the BOE, EOD and EOE fields of the specified data set label are read from the disk. The contents of these fields are converted to standard logical sector numbers and are saved in the driver. If any of these numbers is illegal after conversion, the drive is unlocked and the request completed with bit 11 set in the return code. The CRN is set equal to the BOE number minus one.

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Note: If the TOSS & IBM version of the driver is used, the driver checks if the disk is TOSS-labelled. If the disk is TOSS-labelled, positions 32 - 35 on sector 0 must contain "TOSS" in ISO-7 characters. The disk is IBM labelled if sector 7 positions 1 - 4 contain "VOL1" in EBCDIC characters. If neither label is present, the disk is treated as a TOSS disk.

Order

: /38 - unload

The door of the selected drive is unlocked.

IBM: Before unlocking, the driver checks whether any dataset was opened on this drive. If so, the EOD field of the dataset label is updated to the last sector number addressed by a sequential write, + 1.

Recovery at
power on

: All doors locked at the time of a power failure, will be locked during power off and after power on. The master clear signal given at power on or from the panel will set the drives to Open. At power on, the recovery routines will set the drives to the same status as they had before the power off.

If there was a request current at the time of the power failure, the driver will repeat this request. If it is unsuccessful, the request will be completed with bits set in the return code indicating the error.

DRFD02

2.9 FLEXIBLE DISK

DRFD02

General description : This driver handles up to two daisy chained flexible disk drives PTS6879, PTS6791 or PTS8862, connected to the CPU via channel unit CHFD on multiplex channel. It is not possible to have different types of flexible disk drives in one daisy chain. For PTS6805, only one or two flexible disk drives can be included in the configuration.

Logically the drives are independent of each other; however, physically, only one drive can be operated at a time, and each disk has its own file code.

Recommended file codes are /F8, /F9, /FA and /FB, and these are assigned automatically if one of the data management packages, or File Management is included during Monitor generation.

On the physical level, the flexible disk must be preformatted to be compatible with IBM 128-1 (single sided, single density) or IBM 256-2D (double sided, double density).

IBM 128-1:

Data is stored per sector with 128 bytes in each sector. Each disk has 26 sectors per track, and a total number of 77 tracks, thus giving a total number of 2002 sectors per disk and a capacity of 0,25 Mbyte.

IBM 256-2D:

Data is stored per sector with 256 bytes in each sector. Only sectors 0 - 25 contain 128 bytes per sector. Each disk has 26 sectors per track, 2 tracks per cylinder, and a total number of 77 cylinders, thus giving a total number of 4004 sectors per disk and a capacity of 1 Mbyte.

Because the driver can handle multiple-sector I/O, it is possible to read and write more than one sector with a single LKM request. The Sequential Read and Write orders (/02 and /06) however, transfer only one sector at a time.

In the driver description, the following abbreviations are used:

TOSS - refers to TOSS-labelled disks.

IBM - refers to IBM-labelled disks, when the IBM handling version of the driver is used.

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One of three versions of the driver can be selected during Monitor generation:
TOSS-labelled disk handling
IBM-labelled disk handling
TOSS- and IBM-labelled disk handling.

Two different types of disks are handled by the driver :
TOSS-labelled, and IBM-labelled.

TOSS-labelled disks:

When reading/writing a sector, each sector is given a TOSS logical sector number in the range 0 - 1000 for format 128-1 and from 0 to 3990 for format 256-2D. In format 128-1, two consecutive physical sectors are combined into one logical sector of 256 bytes. Thus, to convert a TOSS logical sector number to a standard (physical) sector number for this format, the former should be multiplied by 2.

IBM-labelled disks:

The driver permits sequential access to datasets on IBM-labelled disks. An IBM-labelled 128-1 disk may contain up to 19 datasets. Each dataset has its own unique dataset label on one of the physical sectors 08-26 on track 00, corresponding to standard logical sectors 7-25.

An IBM-labelled disk with format 256-2D may contain up to 71 datasets. Each dataset has a unique dataset label on one of the physical sectors 18-26 on cylinder 00 head 0, and on sectors 1-26 on cylinder 00 head 1 (these are the logical sectors 7 - 51). Thus, cylinder zero is completely reserved for the dataset labels.

It is the users responsibility to provide index cylinder 00 with sufficient data, before using the disk. Using the TOSS utility Write IBM Labels (WIL), it is possible to initialize cylinder 00 and create datasets.

Before a dataset is sequentially accessed, it must be opened by a Load request. At this request the user must select the dataset to be opened by specifying the dataset-label number. Only one dataset per drive can be opened simultaneously.

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The data fields of the IBM-labelled disk that affect the driver are:

- Volume ID-field
- Surface indicator
- Physical record length indicator
- Physical record sequence code
- Beginning of extent (BOE) of specified dataset label
- End of Data (EOD) of the specified dataset label
- End of extent (EOE) of the specified dataset label.

The driver can only affect the EOD-field of the disk. Direct access to an IBM-labelled disk is also supported by the driver. Each sector is given a standard logical sector number, in the range 0 - 1923 for 128-1 format, or 0 - 3899 for 256-2D format, by which it can be addressed.

All data on the IBM-labelled disks should be EBCDIC code and will be converted to ISO-7 by the driver.

Note: At sequential read/write requests, no data in the dataset label on disk is affected. However, the CRN or EOD in the driver is updated. Direct access does not affect these items.

Calling sequence	: Normal I/O:	I/O and activate:
	LDK A7,code	LDKL A1,parameter
	LDKL A8,ecb-address	LDK A7,code
	LKM	LDKL A8,ecb-address
	DATA 1	LKM
		DATA -1
		DATA start-address

Order codes	: The following order codes may be used:
	/00 - test status
	/01 - basic read
	/02 - sequential read
	/05 - basic write
	/06 - sequential write
	/11 - physical read
	/15 - physical write
	/1F - format volume
	/24 - write deleted data
	/26 - lock
	/31 - rewind
	/37 - load
	/38 - unload

Buffer address	: Only significant for orders /00, /01, /02, /05, /06, /11, /15, /24. The buffer address must be even.
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Requested length : When writing to the disk, the requested length should
 Effective length : be a multiple of the logical sector length, as follows:

TOSS : (n x 256) where n = 1-255
 IBM(128-1) : (n x 128) where n = 1-511
 IBM(256-2D) : (n x 256) where n = 1-255
 (sectors 26 - 3899)
 IBM(256-2D) : (n x 128) where n = 1- 26
 (sectors 0 - 25)

Control word : Control word 2 must contain the number of the (first)
 sector to be read /written. Control word 1 must be set
 to zero. For order /37, Control Word 1 must contain the
 dataset number.

Return code : The following bits may be set by this driver:

bit	Meaning	Orders in which bit set												
		/00	/01	/02	/05	/06	/11	/15	/1F	/24	/26	/31	/37	/38
0	Illegal request	x	x	y	x	y	x	x	x	x	x	y	x	x
2	End of extend (IBM)					y								
3	End of data (IBM)			y										
4	No data/format	x	x	y			x						y	
5	IBM label	y									x		y	
6	Write protected (status or warning)	x			x	y		x	x	x				y
7	Retries performed		x	y	x	y	x	x	x	x	x		x	y
9	Write protected (error)				x	y		x	x	x	x			
10	New volume loaded	x	x	x	x	x	x	x	x	x				
11	Illegal data set label												y	
12	Incorrect length		x	y	x	y	x	x		x				
13	CRC error		x	y		y	x	x		x	x		x	y
14	Seek error		x	y	x	y	x	x	x	x	x		x	y
15	Not operable	x	x	y	x	y	x	x	x	x	x	y	x	x

Note: x = TOSS and IBM, y = IBM

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An explanation of the bit meanings is given below:

- Bit 0: Illegal request - illegal order, file code or sector number
- Bit 2: End of extent (IBM) - set if a Sequential Write order addresses a sector outside the physical space reserved for the data set at creation time.
- Bit 3: End of data (IBM) - set if a record with a number equal to or greater than the EOD is addressed by Read Sequential.
- Bit 4: No data - set if any of the sectors read has a 'Deleted Address' mark set.
For the order /00, Test Status, this bit indicates the disk format:
0 = format 128-1
1 = format 256-2D
- Bit 5: IBM label - set if the disk is IBM-labelled. Only significant if the TOSS & IBM version of the driver is used.
- Bit 6: Write protected - set if the flexible disk does not have a write-enable marker on it.
- Bit 7: Retries performed - set if retries have been performed by the driver due to CRC or seek errors.
- Bit 9: Write protected - set after Write orders, together with bit 6 if the flexible disk has no 'write-enable' marker.
- Bit 10: New Volume Loaded - set after system restart, when the volume name read from the disk is different from the volume name that is already stored in the disk Device Work Table. No I/O is performed. The file must be closed, this is the only order that will be accepted. To access the file after that it must be opened again.
- Bit 11: Illegal dataset label(IBM) - set if the BOE/EOD/EOE fields can not be transformed into legal logical sector numbers.
- Bit 14: Seek error - set if the requested track is not found after recovery has been performed.
- Bit 15: Not operable - drive is not in operable state.

Order

: /00 - test status

The addressed drive is selected and its status checked. If the disk is operable, the Volume Name is stored in the Flexible Disk DWT. If the disk is not operable, the request is completed with bit 15 set in the return code. If the requested length is 6, the volume name is transferred to the buffer specified in the ECB.

For this order, bit 4 in the return code has a different meaning and indicates the format of the disk:
0 = format 128-1
1 = format 256-2D

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- Order : /01, /11 - Basic and physical read.
Control word 2 must contain the sector number of the first sector to be read. Control word 1 must be zero. One or more sectors are transferred from the disk to the user buffer.
- Order : /02 - sequential read
This order only applies to IBM-labelled disks. The CRN is incremented by one, and the record now pointed to is read into the user buffer. The requested length is not significant, 128 bytes for format 128-1, or 256 bytes for format 256-2D, are always transferred. Control word 2 will be set by the driver with the standard logical sector number of the addressed sector.
This request is only accepted, if the corresponding data set has been opened with an order /37 - load. If a request error occurs, or the disk is not operable, the CRN will be unchanged.
- Order : /05 - basic write
One or more sectors are transferred from the buffer to the disk. No read after write checking is carried out.
- Order : /06 - sequential write
This order only applies to IBM-labelled disks. One sector is written from the user buffer to the sector pointed to by the corresponding EOD number in the driver. The EOD number is incremented by one. The requested length is not significant, since 128 or 256 bytes are always transferred. If an attempt is made to address a sector after EOE, the request is completed with bit 2 set in the return code. This order is only accepted if the corresponding data set has been opened with an order /37 - load. If a request error occurs, or the disk drive is not operable, the EOD number will not be incremented.
The standard logical sector number of the addressed sector will be set in control word 2, by the driver.
- Order : /15 physical write
One or more sectors are tranferred from the buffer to the disk. Read-after-write checking is carried out.
- Order : /1F - format volume
The volume will be formatted,. To obtain a TOSS format, the ECB control word must contain 0. The driver will write a volume label on sector 0. To obtain IBM format, the ECB control word must be set to 1. The driver will write a volume label on sector 6.

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- Order : /24 - write deleted data
See order /15, Physical Write for details. The only difference between order /15 and /24 is that the sectors written by order/24 are preceded by a Deleted Data Address mark.
- Order : /26 - lock
The driver locks the door of the selected device. In the case of an error at this request the door will be unlocked at return. If the drive is already locked, no action is taken and the request is completed with a return code of zero, no bits set.
- Order : /31 - rewind
This order only applies to IBM-labelled disks. The EOD number of the selected drive is set equal to the BOE number. The CRN is set equal to the BOE number minus one.
This order is only accepted if the corresponding data set has been opened with an order /37 - load.
- Order : /37 - load
The driver locks the door of the selected drive. This order must be successfully completed before any other request for the same disk can be executed. If an error occurs, the door will be unlocked before the return. The volume name is read and stored in the Monitor. Control word 1 must contain the dataset label number, i.e. a number in the range 7 - 25 for format 128-1 or 7 - 77 for format 256-2D.
- After the driver has taken the actions described above, the BOE, EOD and EOE fields of the specified data set label are read from the disk. The contents of these fields are converted to standard logical sector numbers and are saved in the driver. If any of these numbers is illegal after conversion, the drive is unlocked and the request completed with bit 11 set in the return code. The CRN is set equal to the BOE number minus one.
- Note: If the TOSS & IBM version of the driver is used, the driver checks if the disk is TOSS-labelled. If the disk is TOSS-labelled, positions 32 - 35 on sector 0 must contain "TOSS" in ISO-7 characters. The disk is IBM labelled if sector 7 positions 1 - 4 contain "VOL1" in EBCDIC characters. If neither label is present, the disk is treated as a TOSS disk.

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Order

:/38 - unload

The door of the selected drive is unlocked.

IBM: Before unlocking, the driver checks whether any dataset was opened on this drive. If so, the EOD field of the dataset label is updated to the last sector number addressed by a sequential write, + 1.

Recovery at
power on

: All doors locked at the time of a power failure, will be locked during power off and after power on. The master clear signal given at power on or from the panel will set the drives to open. At power on, the recovery routines will set the drives to the same status as they had before the power off.

If there was a request current at the time of the power failure, the driver will repeat this request. If it is unsuccessful, the request will be completed with bits set in the return code to indicate the error.

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General information      : This driver handles the General Terminal Printer
                        : PTS6321.
                        : The driver includes a device-dependent echo function,
                        : which makes it possible to use the printer as an echo
                        : device for any keyboard that runs under the general
                        : keyboard driver DRKB04.

                        : If a Memory Management Unit is included in the system,
                        : an MMU buffer is included in the driver, and the size
                        : of this buffer must be specified during Monitor
                        : generation.

Calling sequence         : Normal I/O:
                        : LDK  A7,code
                        : LDKL A8,ecb-address
                        : LKM
                        : DATA 1
                        :
                        : I/O and Activate:
                        : LDKL A1,parameter
                        : LDK  A7,code
                        : LDKL A8,ecb-address
                        : LKM
                        : DATA -1
                        : DATA start-address

Order code              : The following order codes may be used:
                        : /00 - test status
                        : /05 - basic write
                        : /06 - standard write

Buffer address          : } Only significant for orders /05 and /06. For order
Requested length        : } /05 the first word in the buffer is used for normal
Effective length        : } output data. For order /06 the first word must be
                        : reserved for a control code, and this word must be
                        : included in the requested length.

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Return code : The following bits may be set by this driver:

bit	Meaning	Order		
		/00	/05	/06
0	Illegal request	x	x	x
13	Code check error			x
14	Throughput error		x	
15	Not operable	x		

Control word : Not significant.

Order : /00 - test status
A dummy character is sent to the printer. If time out is signalled by the channel, bit 15 is set in the return code (power off on selector unit).

Order : /05 - basic write
The requested number of characters are sent to the printer without any check. Trailing spaces are suppressed if this is requested during Monitor generation.

Order : /06 - standard write
The first word in the buffer is reserved for control information. It may contain one of the following codes in the rightmost byte:
/2B : Print the line without advancing the paper.
The print head is not moved before the text is printed.
/30 : Advance the paper two lines before printing and perform carriage return.

Any other code will cause carriage return and line feed before the text is printed. All alphanumeric characters in the range /20 - /5F, in the user buffer, are sent to the printer. Codes /60-7F are reduced by /20, giving /40-5F.

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Continued

DRGP01

The standard codes for roomless point digits are /21, /22, /23, /24, /3B, /3C, /3E, /40, /5E, and /5F for 0, 1, 2, ..., 9. Non-standard codes for roomless point digits may be specified during Monitor generation. The following special characters may appear in the data to control the output printing:

- /AE The point is printed as roomless; that is, the digit following /AE is converted and printed as a roomless point digit (point placed to the left of the digit). If roomless point must be excluded from the driver, this must be specified during Monitor generation. It will then be printed as a point.
- /13 This code is sent directly to the printer. By hardware, this causes a special character to be printed.
- /14 as /13 above.
If special characters /13 and /14 are to be included, they must be specified during Monitor generation.
- /11 Tabulation character; this character must be followed by two ISO-7 digits, giving the tabulation position on the current line.
- /09 Hardware tabulation
Note :Hardware tabulation will reset the head position counter in the driver, and this may cause text to be overwritten when recovering from power failure.

Special characters and tabulation characters must be included in the requested length. Illegal characters in the buffer are ignored, and the request is completed with bit 13 set in the return code. Trailing spaces are suppressed in the printout if this is requested during Monitor generation.

Echo function

- : The printer may be attached to a keyboard as an echo device. All characters in the range /20 - /5F are echoed. Each character is echoed together with a space to get visibility of the last character printed, if requested during Monitor generation. End of record character is echoed if it is in the range /20 - /5F for standard read or /30 - /39 for numeric read. If this is required it must be specified during Monitor generation. Backspace key (code /08 from the keyboard driver) is echoed with code 20 (-). After Clear the paper is advanced one line and the print head is sent to the position it was in before the read-with-echo request was set up. Head positioning is carried out with backspace.

I/O DRIVER REFERENCE

DRGP01

Continued

DRGP01

Recovery at
power on

: At power up the following actions are taken:
If the order is /06, the print head is sent to the
position it was in before the write request, and the
line is printed.
If the order is /05, the request is completed with bit
14 set in the return code.
If the printer is in echo mode, no action is taken.

I/O DRIVER REFERENCE

DRGP02

2.11 GENERAL TERMINAL PRINTER

DRGP02

General information : This driver handles the PTS8081 printer, connected to the CPU via V-24 interface cards ASCUZ or SALCUZ. The printer contains two print stations, one for continuous stationery, and one (optional) for printing documents. If the document station is used, it must be specified during Monitor generation. The two stations are logically two devices, each with its own file code. The recommended file codes are /30 for the line printer and /32 for the document station.

The document station can print on documents of widths between 148mm to 305mm maximum, and form height of 148mm to 330mm maximum.

The line printer can handle continuous stationery with a width between 100 and 375mm. Up to 5 copies can be produced simultaneously, with width 148 to 297 mm and height between 51 mm. and 305 mm.

It is not possible to print more than one line with each request.

Calling sequence	:	Normal I/O:	I/O and Activate:
		LDK A7,code	LDKL A1,parameter
		LDKL A8,ecb-address	LDK A7,code
		LKM	LDKL A8,ecb-address
		DATA 1	LKM
			DATA -1
			DATA start-address

Order codes : The following order codes may be used:

- /00 - test status
- /06 - write
- /0B - position document
- /24 - set printer parameters
- /38 - release document

DRGP02

Continued

DRGP02

Buffer address :
 Requested length : } Only significant for order /06
 Effective length : }

Return code : The following bits may be set by this driver:

		Order				
bit	Meaning	/00	/06	/0B	/24	/38
0	Request error		x	x	x	x
2	End of paper/document out	x	x	x	1	
13	Code check error		x			
15	Printer not operable	x	x	x		

Control word : Only significant for orders /0B and /24, containing the line number for order /0B and the parameters for order /24

Order : /00 - test status
 This order may be used to test the status of either of the two print stations, and the return code shows the status on completion of the request.

Order : /06 - write
 If using the document station, the document must have been positioned using order /0B before this order is accepted. Else, bit 0 will be set in the return code.

This order results in the printing of one line on either the continuous stationery or the document station. The first word in the buffer must contain a control character in the righthand byte, while the contents of the left byte is irrelevant. The control characters are:

- /2B ~ print the line without advancing the paper.
 Printing starts from the position following the last printed position on the line.
- /30 ~ advance the paper two lines before printing.
- /31 ~ skip to top of form or print on top line of document.

DRGP02

Continued

DRGP02

Any other value in the control code will result in one line feed being made before the line is printed. The requested length must include these two bytes. If the requested length contained in the ECB is set to 2, only the action specified by the control character is carried out.

Control code /31 makes it possible to print on the document station without previous positioning of a document. In this case the driver will wait till a document is inserted in the document station, before completing the request.

All alphanumeric characters in the range /20-/7E are accepted and sent to the printer. If an illegal character (/7F-/FF, except /AE) is detected in the buffer, it is ignored, and the request is completed with bit 13 set in the return code. The character /AE (roomless point) is converted to /2E (point) and printed as a point.

If the end-of-paper condition is detected, the request is completed with bit 2 set in the return code. The request is completed with bit 15 set in the return code (not operable), if any of the following conditions exist:

- The printer is switched off.
- The cover is open.
- The single line or top of form key is pressed.
- A form is inserted illegally in the front gate.
- The request specifies the document station, and the document station does not exist in the device.

Order

: /OB - position document

This order must be issued to the document station, to position the document, before any printing may take place. The control word must contain the line number in binary form. The top line is counted as line number 1.

The lower edge of the last line on the document is 48,5mm from the bottom of the document. If no document is in the station, the driver will wait till a document is inserted before completing the request. The request is completed with bit 15 (not operable) set in the return code, if any of the following conditions exist:

- The printer is switched off.
- The cover is open.
- The single line or top of form key is pressed.
- A form is inserted illegally in the front gate.
- The request specifies the document station, and the document station does not exist in the device.

DRGP02

Continued

DRGP02

Order

: /24 - set printer parameters

When the device addressed by Write orders changes from the document station to the station for continuous forms and vice versa, and the parameters for one of the devices have been changed by order /24, this order must be issued again to set the parameters for the addressed device to the correct values before printing is started. This order makes it possible to change one or both of the following parameters:

- The number of lines between form feed on the continuous stationery device, or the number of lines on a document.
- The National Character variation.

Number of lines:

Bits 0-7 of the control word must contain a value in the range /01 - /10, to specify the index to the selected number of lines according to the following table:

Index	Document station Number of lines	Line printer Page length (inches)
1	12	2
2	15	2 1/2
3	18	3
4	24	4
5	25	4 1/6
6	30	5
7	33	5 1/2
8	35	5 5/6
9	36	6
/A	48	8
/B	50	8 2/6
/C	51	8 1/2
/D	60	10
/E	66	11
/F	70	11 4/6
/10	72	12

The line spacing is 1/6 inch.

Page length on the line printer is the distance between two form feeds.

National character variation:

Bits 8-15 of the control word must contain a binary value indicating the selected national character variation according to the table at the end of this driver description.

DRGP02

Continued

DRGP02

Order /38 : Release document
This order is used to release the document when the printing is finished. If no document is in the station, no action is taken and the request is completed with no bits set in the return code.

Recovery at power on : After power up on the computer, the document is positioned to the current position and any requests that were current or in the queue are repeated.

Monitor generation parameters : The following parameters may be specified during Monitor generation:

- If a document station is included - default: no document station.
- Page length on the printer. Only the values specified in the table for order /24 - set parameters - are allowed. Default 48 lines.
- Number of lines on document. Only the values specified in the table for order /24 - set parameters - are allowed. Default 36 lines.
- National character set - specified as a value 1 through 15, according to the following list: (Default is 2).

- 1 - Germany, Austria, Luxembourg, Switzerland
- 2 - Great Britain Netherlands, Belgium, New Zealand, South Africa.
- 3 - France, Switzerland, Belgium, Luxembourg,
- 4 - Spain, Mexico, Argentina, Venezuela
- 5 - Italy, Switzerland
- 6 - Sweden, Finland
- 7 - Denmark, Norway
- 8 - Portugal, Brasil
- 9 - Yougoslavia
- 10 - USA, Canada, Australia
- 11 - Sweden (special version)
- 13 - Greece *
- 14 - Japan *
- 15 - Israel *

* With another character generator in the printer.

DRGP03

2.12 GENERAL TERMINAL PRINTER

DRGP03

General information : This driver handles the PTS6374/75 General Terminal Printer connected to the CPU via CHRT or CHLRT, or via the V24 interface cards ASCU4Z or SALCUZ, or via LWSI/RWSI.

In the standard version this printer has one print station with friction paper feed mechanism. It can optionally be furnished with a tractor feed mechanism for continuous stationery.

Front feed for document stationery is an option when the tractor feed mechanism is included.

Logically the options are treated as a subdevice with a different file code. Recommended file codes are /30 for the tractor feed and /32 for the front feed device and friction feed handler.

The two logical devices are assigned to the same DWT, but with different indices, being 0 for the tractor feed device (continuous stationery) and 1 for the document handler (friction feed or front feed).

The friction feed version handles single sheets or top-glued form sets of widths from 105 mm to 307 mm maximum and a minimum height of 70 mm.

The front feed handles single sheets or bottom glued form sets of widths from 105 mm to 304 mm. and height between 148 mm and 330 mm maximum.

The tractor feed handles continuous fan-folded paper with a width from 148 mm to 340 mm, including the paper guide, and a height from 101 mm to 304 mm (distance between the perforations).

The number of copies that can be printed with acceptable quality depends also on the quality of the paper.

Generally one original plus three copies can be printed.

A 9x9 character matrix and a 18x25 character matrix are installed in the standard version of the printer. It is possible to have different matrixes instead, and a third matrix can be added. With an (optional) additional board in the printer, 6 more character matrixes can be installed.

The print speed is 150 char/sec. when the 9x9 matrix is used, and 80 char/sec. when the 18x25 matrix is used.

It is not possible to print more than one line with each request.

After printing on tractor feed stationery it is recommended to issue a form feed before power off on the printer, or before changing to print on front feed device. This will make the actual page position correspond with the hardware page length control, which is reset to the beginning of a page.

DRGP03

Continued

DRGP03

Calling sequence : Normal I/O:
 LDK A7,code
 LDKL A8,ecb-address
 LKM
 DATA 1

I/O and Activate:
 LDKL A1,parameter
 LDK A7,code
 LDKL A8,ecb-address
 LKM
 DATA -1
 DATA start-address

Order codes : The following order codes may be used:
 /00 - test status
 /05 - basic write
 /06 - write
 /0B - position document
 /24 - set printer parameters
 /27 - set form parameters
 /38 - release document

Buffer address : Only significant for orders /05, /06 and /27. For order
 Requested length : /06, the first word in the buffer contains a control
 Effective length : character in the right byte. This word must be included
 in the requested length.

Return code : The following bits may be set by this driver:

bit	Meaning	Order						
		/00	/05	/06	/0B	/24	/27	/38
0	Illegal request			x	x	x	x	
2	End of paper/document out		x	x				
7	Recovery after power on	x	x	x	x	x	x	x
13	Illegal character in buffer			x				
15	Printer not operable	x	x	x	x	x	x	x

Control word : Only significant for orders /00, /0B, /24, /27.

DRGP03

Continued

DRGP03

Order

: /00 - test status

This order may be used to test the status of either of the two print stations, and the return code shows the status on completion of the request.

This request is completed with bit 15 (printer not operable) set in the return code if the power is off, if an ink ribbon error is detected, or if the printer is otherwise not operable. If there is a permanent error condition in the printer, bits 8-15 of the ECB control word will contain the 'service status' to indicate the error:

<u>Value</u>	<u>Indicating</u>
--------------	-------------------

00	No service status information present
08	Firmware error
10	Printer control unit I general
11	Printer control unit I ROM
12	Printer control unit I RAM
13	Printer control unit I V24 interface
14	Printer control unit I I/O control operator panel
15	Printer control unit I I/O control paper handling
20	Printer control unit P general
21	Printer control unit P ROM
22	Printer control unit P RAM
23	Printer control unit P I/O control horizontal drive
24	Printer control unit P I/O control needles
31	Printer control unit PHOPT ROM
33	Printer control unit PHOPT I/O control keyboard
34	Printer control unit PHOPT I/O control front feed
41	Printer control unit CARGEN ROM
42	Printer control unit CARGEN RAM
50	Device horizontal drive
51	Device needles
52	Device vertical drive
53	Device bar code reader
60	Device front feed
61	Device automatic single sheet handler
70	Device operator panel
71	Device keyboard
99	Undefined error

Order:

/05 - basic write

With this order all characters in the user buffer are sent to the printer without any check. Both data characters and printer control codes can be sent. Carriage Return and Line Feed must be inserted in the text where they are wanted.

DRGPO3

Continued

DRGPO3

Order:

/06 - standard write

This order results in the writing of one line on either the continuous stationery or the document station. When printing on the document station, the document must have been positioned by order /0B or by the control code /31 in the second byte in the buffer, before any printing is started.

The first word in the buffer must contain a control character in the right byte. This word must be included in the requested length. The control value may be one of the following:

/2B - print the line without advancing the paper.

Printing starts from the position following the last printed position on the line. If order /0B (position document) was executed previously, a carriage return is performed before printing is started.

/30 - advance the paper two lines and carriage return before printing.

/31 - form feed: skip to top of form for continuous stationery, or insert a new document to top line and print. A previously inserted form is ejected. If a form is ejected or there is no form in the hopper, the device will switch off-line. When this occurs and the SYSGEN option 'End of request if inactive' is not specified, pressing the start key will bring the device back on-line and the document will be inserted and positioned. If this option is specified, the instruction will terminate with bit 15 set in the return code.

Any other value in the control code will result in one line feed and carriage return being made before the line is printed. If the requested length in the ECB is set to 2, only the action specified by the control character is carried out. If the requested length is zero, a line feed and a carriage return are performed.

A number of control codes may be inserted in the text to perform the following functions of the printer:

<u>Code</u>	<u>Meaning</u>
-------------	----------------

/09	Horizontal tabulation.
-----	------------------------

The current print position is advanced to the next tabulation stop on the current line.

The tabulation stops must have been set by the order /27, set form parameters. This control code must not be used in combination with code /2B (print from current position).

DRGP03

Continued

DRGP03

- /1B Partial line up/down.
This code must be followed by one of the following two codes:
- /4C Partial line movement up .
- /4B Partial line movement down .
Partial line up/down condition, once set, remains valid until the opposite code is sent, even if new requests are started.
- /12 Start underline
All output characters following this code will be printed underlined, until a stop underline code (/13) is sent.
- /13 Stop underline
Output characters that follow this code will be printed without underlining.

If the requested parameters are not correctly supplied, the request is completed with bit 0 set in the return code.

Bit 2 will be set in the return code if:

- if the stacker of the automatic single sheet handler is full.
- if there is no paper in the printer.
- if the paper is not fed properly.

For front feed or friction feed only, the error lamp on the printer panel is lit when a paper must be inserted. After correction of the situation, the operator must press the Start key on the printer.

Control code /31 makes it possible to print without previous positioning of a document. In this case the printer will wait for the document to be inserted in the document station, before completing the request.

All alphanumeric characters in the range /20-/7E and /A1-/FE are accepted and sent to the printer.

In the range /00-/1F some codes are reserved for special characters, the other codes are ignored by the driver. If an illegal character is detected in the buffer, it is ignored, and the request is completed with bit 13 set in the return code.

The character /AE is converted to /2E and printed as a point.

If the end-of-paper condition is detected, the request is completed with bit 10 set in the return code.

The request is completed with bit 15 set in the return code (not operable), if any of the following conditions exist:

- The printer is switched off.
- The Single Line or Top of Form key is pressed.
- A form is inserted illegally in the front gate.

DRGP03

Continued

DRGP03

Order

: /OB - position document

This order may be issued to the front feed or friction feed document station, to advance the single sheet to a specific line before printing starts.

The order /OB is excluded from the driver if only tractor feed is specified during Monitor generation.

When there is no paper in the front feed device or the friction feed device the printer will wait for the document to be inserted before completing the request. The error lamp and start/stop lamp will be lit. After inserting a paper the operator must press the Start key on the printer.

The right byte of the ECB control word must contain the line number where to position the document, in binary form. This value may be higher or lower than the current line number, the document will be moved backward or forward as required.

The order may be completed with bit 0 set in the ECB return code, if the parameter is not valid.

Bit 15 will be set if the printer is not operable (power off, ink ribbon error or other reason).

Order

: /24 - set printer parameters

This order makes it possible to change one or more of the following parameters:

- The number of lines between form feed on the continuous stationery device, or the number of lines on a document.
- The National Character variation.
- Character matrix
- Character density

This order need only be used if it is necessary to change one or more of these parameters during application running. Otherwise, the parameters are set up during Monitor generation.

The order will change the parameters for one sub-device at a time. The parameters are stored in the device work table DWT, separate for each device, and the correct parameters are automatically sent to the printer.

The ECB control word contains values for the parameters to be changed, as described below. If a parameter must not be changed, the corresponding bits in the control word must be set to zero.

Bits 0-3 indicate the character density

- 1 := 10 characters/inch
- 2 := 12 characters/inch
- 3 := 15 characters /inch
- 4 := proportional. Character width determined by the character generator.

DRGP03

Continued

DRGP03

Bits 4-7 must contain a value in the range /01 - /0F, to specify the index to the selected page length for the hardware form-length control-function.

The actual line space must be taken into account when changing this parameter, for a change of line space afterward with order /27, set form parameters, will not affect the selected page length.

The table below shows the page lengths corresponding to the different parameter values, for the line spacings 1/12", 1/8", 1/6", 1/4", 1/3", and the resulting number of lines per page.

Parameter value	Line spacing					lines/ page
	1/12"	1/8"	1/6"	1/4"	1/3"	
1	1 1/4	1 7/8	2 1/2	2 3/4	5	15
2	1 1/2	2 1/4	3	4 1/2	6	18
3	2	3	4	6	8	24
4	2 1/12	3 1/8	4 1/6	6 1/4	8 1/3	25
5	2 1/2	3 3/4	5	7 1/2	10	30
6	2 3/4	4 1/8	5 1/2	8 1/4	11	33
7	2 11/12	4 3/8	5 5/6	8 3/4	11 2/3	35
8	3	4 1/2	6	9	12	36
9	4	6	8	12	16	48
A	4 1/6	6 1/4	8 1/3	12 1/2	16 2/3	50
B	4 1/4	6 3/8	8 1/2	12 3/4	17	51
C	5	7 1/2	10	15	20	60
D	5 1/2	8 1/4	11	16 1/2	22	66
E	5 2/3	8 3/4	11 2/3	17 1/2	23 1/3	70
F	6	9	12	18	24	72

Page length on the line printer is the distance between each top of form.

Bits 8-11 indicate the character matrix, provided the necessary hardware is present:

- 1 9x9 or primary matrix
- 2 18x25 or first alternative matrix
- 3 first text quality or second alternative matrix
- 4,5,6 reserved for optional resident matrixes
- 7,8,9 reserved for optional loadable matrixes

The following combinations of character density and matrix font are allowed:

Matrix Character density

9x9	1,2
9x7	3
18x25	1,2,4
36x50	1,2,3

DRCP03

Continued

DRCP03

Bits 12-15 indicate the selected National Character variation with a value according to the table at the end of this driver description.

The request is completed with bit 0 set in the return code if any of the parameters has an illegal value. Bit 15 will be set if the printer is not operable.

Order /27:

Set form parameters

With this order, form parameters are set for the friction or tractor feed and the front feed device. It is not possible to set form parameters for these subdevices separately.

The ECB control word must contain a value in bits 12-15, defining the type of the information sent to the printer as follows:

- 1 further information is present in the Control Word
- 2 basic write
- 3 set or clear horizontal tabulation positions.

Value 1

Information set in Control Word.

Bits 8-11 contain a binary value to select the number of lines per inch, according to this table:

<u>Value</u>	<u>lines/inch</u>
1	3
2	4
3	6
4	8
5	12
6	15
7	24
8	48

Note that a newly selected line spacing will not affect the page length as set for the printer during Monitor generation or by order /24 (set printer parameters).

DRGP03

Continued

DRGP03

Value 2

Basic Write

The order /27 can now be used in the same way as the order /05, Basic Write.

Value 3

Set or clear horizontal tabulation positions.

Buffer address and requested length must be set in the ECB.

The first byte in the specified buffer contains a control value (binary)

0 - Clear all tabulation positions

The tabulation positions need not be specified.

1 - Set tabulator positions

Up to 16 tabulation positions can be set. The positions must be defined by binary values in the second and next bytes in the buffer. For example, to set tabulation positions at position 2, 15 and 23, the buffer for this order must contain the value 0 in the first byte, 2 in the second, 15 in the third and 23 in the fourth byte.

When code /09 is recognised in the text string in a subsequent write request, the print head is moved to the next horizontal tabulation position set up by this order.

The order /27 will be completed with bit 0, request error, set in the return code if an illegal parameter value is given, except for the index values 2 and 3 (set or clear tabulation).

The request is completed with bit 15 set if the printer is not operable.

Order /38

: Release document

This order is used to release the document when the printing is finished. It can be used if front feed or friction feed is included. If no document is in the station, no action is taken and the request is completed with no bits set in the return code.

Recovery at
power on

: After power up on the computer, the actual parameters are sent to the printer except those which had been set by the order /27 (set form parameters) and any current request is repeated. Bit 7 in the return code will be set to indicate that recovery has been executed. A running request will be ended with bit 15 set in the return code if this is specified during Monitor generation. This is recommended if the communication interface has no automatic power-up function.

The form feed control function will have reset the line counter, although the actual page length has been sent to the printer during recovery.

DRCP03

Continued

DRGP03

Monitor generation parameters : The following parameters may be specified during Monitor generation:

- If a front feed or friction feed is included. (Default tractor feed).
- Page length on the printer. Only the values specified in the table for order /24, Set Parameters, are allowed. Default 64 lines.
- Number of lines on document. Only the values specified in the table for order /24, Set Parameters, are allowed. Default 64 lines.
- Character matrix. (Default 1).
- Character density. (Default 10 char/inch).
- End of request if printer not operable. (Default No).
- Order /27, Set Form Parameters, included. (Default Yes).
- National character set specified as a value 1 thru 15, according to the following list (Default 2):
 - 1 - Germany, Austria, Luxembourg, Switzerland
 - 2 - Great Britain Netherlands, Belgium, New Zealand, South Africa.
 - 3 - France, Switzerland, Belgium, Luxembourg,
 - 4 - Spain, Mexico, Argentina, Venezuela
 - 5 - Italy, Switzerland
 - 6 - Sweden, Finland
 - 7 - Denmark, Norway
 - 8 - Portugal, Brasil
 - 9 - Yougoslavia
 - 10 - USA, Canada, Australia
 - 11 - Sweden (special version)
 - 12 - Greece *
 - 13 - Japan *
 - 14 - Israel *

* With another character generator on the printer.

I/O DRIVER REFERENCE

DRGP03

Continued

DRGP03

Table of national character variations.

		Character code									
NCV	Countries	/23	/40	/5B	/5C	/5D	/60	/7B	/7C	/7D	/7E
1	Germany, Luxembourg, Austria, Switzerland	#	§	Ä	Ö	Ü	'	ä	ö	ü	ß
2	Great Britain, Netherlands, Belgium	£	@	[\]	'	{		}	~
3	France, Switzerland, Belgium, Luxembourg	£	à	°	ç	§	'	é	ù	è	~
4	Spain, Argentina, Venezuela, Mexico	£	@	[Ñ]	'	{	ñ	}	~
5	Italy, Switzerland	£	§	°	ç	é	ù	à	ò	è	ì
6	Sweden, Finland	#	É	Ä	Ö	Å	é	ä	ö	å	~
7	Denmark (1) Norway	£	@	Æ	Ø	Å	'	æ	ø	å	~
8	Portugal, Brazil	£	@	À	Ç	Õ	'	ã	ç	õ	~
9	Yugoslavia	£	Ž	Ć	Č	Š	ž	ć	č	š	~
10	USA, Canada, Australia	#	@	[\]	'	{		}	~
11	Sweden, industry version	£	@	Ä	Ö	Å	'	ä	ö	å	~

I/O DRIVER REFERENCE

DRGP04

2.13 HARDCOPY PRINTER HP75

DRGP04

General information : This driver handles the hardcopy printer HPC 6323 (HP75).

If a Memory Management Unit is included in the system, an MMU buffer is included in the driver, and the size of this buffer must be specified during Monitor generation.

Calling sequence : Normal I/O: I/O and Activate:
 LDK A7,code LDKL A1,parameter
 LDKL A8,ecb-address LDK A7,code
 LKM LDKL A8,ecb-address
 DATA 1 LKM
 DATA -1
 DATA start-address

Order code : The following order code may be used:
 /00 - test status
 /05 - basic write
 /06 - standard write
 /24 - test output buffer and set printer parameter

Buffer address : } Only significant for orders /05 and /06. For order
 Requested length : } /05, the first word in the buffer is used for normal
 Effective length : } output data. For order /06, the first word must be
 reserved for a control code, and this word must be
 included in the requested length.

Return code : The following bits may be set by this driver:

bit	Meaning	Order			
		/00	/05	/06	/24
0	Illegal request	x	x	x	x
13	Code check error			x	
14	Throughput error		x		
15	Not operable	x	x	x	x

Control word : Only significant for order /24.

Order : /00 - test status
 One line feed is sent to the printer and executed. If the printer is not operable, bit 15 is set in the return code.

DRGPO4

Continued

DRGPO4

Order : /05 - basic write
The requested number of characters are sent to the printer without any check. The last character in the buffer must be a line feed (/0A).

Order : /06 - standard write
The first word in the buffer is reserved for control information. This word must be included in the requested length. It may contain the following code in the right byte:
/30 : Advance the paper one line before printing. As the preceding print request must have ended by a line feed, the result is that two line feeds are generated between the lines of text.

Any other code will cause no special action at all and printing will start at the current position. All alphanumeric characters in the range /20 - /7F, in the user buffer, are sent to the printer. Roomless point is not available, this character code (/AE) will be converted to /2E and printed as an ordinary point.

One special character may appear in the data to control the output printing:

/11 Tabulation character; this character must be followed by two ISO-7 digits, giving the tabulation position on the current line.

The following special characters, if they occur in the buffer, are ignored: /09, /12, /13, /14, /1E, /1F. The hardware needed to perform the functions normally associated with them, is not available in the printer.

Illegal characters in the buffer are ignored, and the request is completed with bit 13 set in the return code. Every standard write request is ended with Carriage Return and a Line Feed.

Order: /24 - Test Output Buffer and Set Printer Parameters
One line feed is sent to the printer, and a parameter is set in the driver to select one of two output modes. Which output mode to select is indicated by bit 15 in the ECB control word:

0 - output mode 1

Standard and basic write requests are finished without waiting for the output buffer in the printer to be empty. This implies that a request can be completed before all characters are printed.

1 - output mode 2

Write requests are not completed before the printer buffer is empty and all the characters have been printed.

I/O DRIVER REFERENCE

DRGP04

Continued

DRGP04

If there are any characters in the printer buffer when this order /24 is issued, these characters are printed before the line feed is sent to the printer and the parameter is changed.

Recovery at
power on:

No recovery is performed at power on.
If there is a request current, it is completed with bit 14 set in the return code.